The impact of microplastics exposure on human fertility

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ABSTRACT

Introduction: Microplastics (MPs) are small plastic particles (<5mm) widely present in the environment and increasingly detected in human biological samples, including blood, placenta, and reproductive tissues. Due to their ability to act as carriers of toxic chemicals and their potential to disrupt human physiology, concerns have emerged regarding their effects on fertility and reproductive health. The objectives are to investigate the presence and accumulation of microplastics in reproductive tissues and fluids, to evaluate the effects of microplastics on hormonal regulation, particularly endocrine function and reproductive hormone levels and to explain the pathway of microplastics to human tissues. **Materials and Methods:** A scoping review approach was conducted using literature from scientific databases including PubMed, Google Scholar, Elsevier, and Scopus. Both observational and experimental studies were included to assess microplastics' presence in human tissues, toxicological profiles and reproductive outcomes. English open access articles reviewed over the last 10 years (2014-2024). Keywords used are Microplastics, Human Fertility, Reproductive toxicity, Endocrine disruption, Oxidative stress, Embryonic development. **Results:** Microplastics can enter the body through ingestion, inhalation, and dermal contact, and have been detected in critical biological sites such as blood, placenta, and reproductive tissues. Acting as carriers for endocrine-disrupting chemicals, they contribute to hormonal imbalances, oxidative stress, inflammation, and DNA damage. These mechanisms are linked to reduced sperm quality, impaired ovarian function, and disrupted embryonic development which are supported by animal and in vitro studies. Microplastics impair reproductive health by triggering oxidative stress, hormonal disruption, inflammation, and cell death in gonadal tissues, affecting both sperm and egg quality. These changes can also impact fetal development, leading to long-term fertility issues and potential transgenerational effects. **Conclusion:** This scoping review highlights the emerging threat of microplastics to human reproductive health. Although human clinical evidence remains limited, current findings from animal and in vitro studies strongly support the potential reproductive toxicity of microplastic exposure and emphasize the urgent need for further investigation and preventive action.

Keywords: Microplastic, reproductive health, hormone, endocrine-disruptors